**Chapter Summaries**

***Animal Behavior,* Twelfth Edition**

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**CHAPTER 2**

1. Different populations of birds often sing distinct forms of the same song, called dialects. To understand how birds learn different dialects, we must explore both proximate and ultimate hypotheses for avian song learning.

2. There appears to be little evidence of hereditary differences underlying dialects in several bird species. Instead, young birds appear to learn their distinct songs during a critical window during development. The experience of hearing other males is critical to a young male bird learning its proper song (and a young female learning the preference for that song). Moreover, social interactions in many avian species enhance vocal learning and neural development in the brain during this critical learning window.

3. During the period of song learning, distinct clusters of neurons in the brain called nuclei play a critical role. The high vocal center nucleus, or HVC, is particularly important for male song learning. HVC is bigger in males of species that learn songs than in those that do not, and in many species, it is larger in males than in females.

4. Although most birds sing, only approximately 3 of 23 avian orders (hummingbirds, parrots, and oscine songbirds) include species that learn to sing. It is possible that these three orders of birds shared a common ancestor that was a vocal learner. What’s more, humans and birds—which are clearly unrelated—exhibit convergent neural circuits for vocal learning that are accompanied by convergent molecular changes in multiple genes.

5. There are several hypotheses to explain why vocal learning is adaptive, all of which have to do with the acoustic, social, or ecological environment. These include acoustic adaptation to the local environment, recognition of neighbors or allies within a group, information sharing within groups, mate choice or male–male competition, and the promotion of local adaptation via distinct dialects.